

41
(a) forming a mask layer over the dielectric material wherein said mask layer includes a barrier film, and said mask layer having a known etch selectivity with respect to the dielectric material;

(b) depositing a metallic mask film over the barrier film to increase the etch selectivity of the mask layer and forming a mask layer comprising a composite of the barrier mask film and metallic mask film;

(c) patterning a feature in the mask layer after depositing the metallic mask film;

(d) etching the feature through the mask layer and in the dielectric material after patterning the feature in mask layer; and,

(e) depositing a conductive metal in the feature.

22. The method of claim 21 further comprising the step depositing a passivation mask film over the barrier mask film forming said mask layer as a composite of the barrier mask film, passivation mask film and metallic film.

23. The method of claim 22 wherein said etching step comprises the step of etching the feature in the mask layer down to the barrier mask film, then removing the metallic mask film and passivation mask film after etching the feature in the dielectric material, and before depositing the conductive metal in the feature.

24. The method of claim 21 wherein said step of patterning includes patterning a first feature having predetermined width, and patterning a second feature having a predetermined width, and said second feature is aligned with respect to said first feature.

25. The method of claim 24 wherein said etching step includes etching the first feature in mask layer to the barrier mask film before patterning the second feature, and then etching second feature to the barrier mask film, then etching the second feature a predetermined depth in the dielectric material, before etching the first feature of the dielectric material to a predetermined depth

Sub C31

of the dielectric material spaced above the predetermined depth of the second feature.

26. The mask layer of claim 21 wherein said passivation mask film comprises silicon dioxide or silicon carbonite.

27. The mask layer of claim 21 wherein said barrier mask film comprises silicon nitride.

28. The mask layer of claim 21 wherein said metallic mask film comprises a refractory metal or a refractory metal alloy.

29. The mask layer of claim 28 wherein said refractory metal is chosen from a group of refractory metals comprising titanium, tantalum and tungsten, and said refractory metal alloy is chosen from the group of refractory metal alloys comprising titanium nitride and tantalum nitride.
